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Improvement Vase Life and Postharvest Quality of Cut Chrysanthemum (*Dendranthema grandiflorum* L.) by Eryngo Oil

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ABSTRACT

In order to investigation on the effect of eryngo oil on vase life and postharvest quality of cut chrysanthemum, an experiment was conducted based on completely randomized design with eryngo oil in 4 concentrations (0, 10, 30 and 50%) and 3 replications. Analysis of variance revealed that the effect of eryngo oil on vase life, water uptake and dry matter was significant at 5% probability level. According to mean comparisons, the highest dry matter (22.72%) was obtained in 10% eryngo oil treatment. Also, 30% eryngo oil had the maximum vase life and water uptake with 19.25 days and 1.79 ml g^{-1} F.W. respectively.

Key words*:* chrysanthemum, eryngo oil, vase life, water uptake

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INTRODUCTION

Chrysanthemum (*Dendranthema grandiflorum* L.) belongs to Asteraceae family that is commonly farmed all around the world today [9]. Chrysanthemum is a member of non-climacteric flowers group which has long vase life because it is not sensitive to ethylene, but the formation of air embolism within the stems prevents nutrient and water transport in vascular system which will ultimately result in increased hydraulic resistance and water stress and shortens the vase life of cut chrysanthemum [5, 16]. The using of antibactericidal compounds such as herbal essential oils, environmental friendly compounds, are recommended [10, 15]. Essential oils are a group of aromatic and volatile compounds that have high antimicrobial properties. They are used for control disease in agriculture. Controlling plant disease agents using essential oils (environmental friendly compounds) are known as a new chapter of extending the vase life of cut flowers and microorganisms activity control [3]. Oraei et al. [14] studied on the effect of silver nanoparticles and herbal essential oils on the vase life of cut gerbera (*Gerbera jamesonii*) and found that all this compounds have been effective on the vase life and stem end bacterial contaminations. They stated that 100 mg l^{-1} thyme oil increased the vase life approximately 80% as compared to the control (11.2 days & 6.2 days respectively). Mousavi Bazaz & Tehranifar [12] studied on the effects of alcohol and essential oils on vase life of cut *Alestroemeria hybrida* and found that essential oils can improve water uptake and reduce stem end bacterial contamination in addition to extending the vase life. The aim of this study was to evaluate the effect of eryngo essential oil on vase life and postharvest quality of cut chrysanthemum flowers.

MATERIALS AND METHODS

On May 2012, cut chrysanthemum flowers cv. 'Yellow' was purchased from a commercial greenhouse located in 'Mahallat' city and immediately transferred to the postharvest laboratory of Islamic Azad University of Rasht, under standard conditions. 4 cut flowers were placed in 2 liter plastic vases and then were treated with the determined concentrations of eryngo oil. Experiment carried out based on completely randomized design with 4 levels of eryngo

oil (0, 10, 30 and 50%) in 3 replications.The measured traits were vase life, water uptake, and dry matter percent. Vase life was assessed based on leave's yellowing and petals wilting [13]. Water uptake was calculated by this formula [6]:

Solution uptake (ml g^{-1} F.W.)=500-(Amount of vase solution in final day +Amount of room transpiration).

Flower fresh weight was measured using the digital balance, then plant were dried in 70°C oven, for 24 hours. Dry weight was measured by this formula [6]:

DM%= dry weight/fresh weight×100

Data were subjected to analysis using SPSS and MSTATC software and mean comparisons was done according to LSD test.

RESULTS AND DISCUSSION

Analysis of variance indicated that the effect of eryngo oil on vase life, water uptake and dry matter percent was statistically significant at 5% probability level. Mean comparisons showed that the most effective treatment on vase life was 30% eryngo oil with 19.25 days as compared to the control (18.12 days) (Table 1 Fig. 1). The priority of this treatment can be due to water relations enhancement and preventing bacterial vascular occlusion which extends vase life [4, 11]. Our results about positive effect of herbal essential oils on vase life is in accordance with Oraee et al. [14] and Mousavi Bazzaz & Tehranifar [12]. Solgi et al. [15] found that 50 and 100 mg l^{-1} caravacrol extended vase life of cut gerbera (*Gerbera jamesonii* cv. 'Dune'). Hashemi et al. [7] investigated on the effect of salicylic acid, methyl jasmonate and herbal essential oils on vase life of cut gerbera cv. 'Sazo' and found that thyme essential oil extended vase life about 14 days as compared to the control (38.67 & 24.17 days respectively). Results showed that 30% eryngo oil caused the maximum water uptake (1.79 mlg^{-1} F.W.) (Table 1 Fig. 2). Positive effect of eryngo oil can be due to antimicrobial properties and positive effects of it on the hydraulic conductivity and water relations enhancement of cut flowers which ultimately keeps the vessels open [6, 17].

Table 1- Effect of eryngo oil on vase life, water uptake and dry matter of cut chrysanthemum cv. 'Yellow'

Treatment	Vase life (days)	Water uptake (ml g^{-1} F.W.)	Dry matter (%)
E_1:0% eryngo oil	18.12b	1.73a	20.23b
E_2:10% eryngo oil	18.62ab	1.78a	22.72a
E_3:30% eryngo oil	19.25a	1.79a	22.55a
E_4:50% eryngo oil	18.87ab	1.53b	22.10a

**According to LSD test, in each column, means with the same letters are not significantly different.*

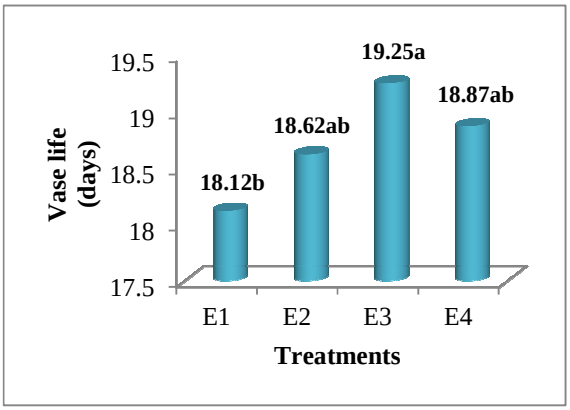

Fig 1- Effect of eryngo oil on vase life of cut chrysanthemum cv. 'Yellow'.
E1: control, E2: 10% eryngo oil, E3: 30% eryngo oil, E_4:50% eryngo oil
**According to LSD test, in each column, means with the same letters are not significantly different.*

Ajmad & Ahmad [1] studied on the effect of plant density and preservative solutions on the postharvest life of cut lily (*Lilium longiflorum*) and found that use of 500 mg l^{-1} antimicrobial compounds had the highest vase solution uptake (0.28 ml g^{-1} F.W.) which is in agreement to our results. Study on effect of eryngo oil on dry matter percent revealed that all applied concentrations of it had more dry matter percent rather than the control and treatment with 10% eryngo oil increased dry matter about 2% (22.72 & 20.23% respectively) (Table 1 and Fig. 3) . Increasing of dry matter percent can be due to reduced metabolism with reduction in transpiration. In addition, antimicrobial

compounds control microorganisms and indirectly increased fresh & dry weight which will be effective on dry matter percent [2, 6]. Present results are in agreement to Mohammadi Ostad Kalayeh et al. [11] and Kazemi & Ameri [8].

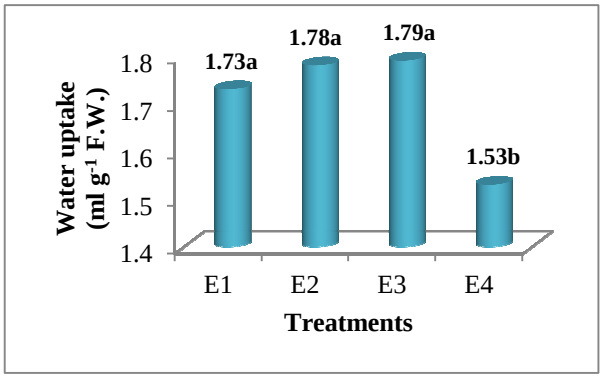

Fig 2- Effect of eryngo oil on water uptake in cut chrysanthemum cv. 'Yellow'.
E1: control, E2: 10% eryngo oil, E3: 30% eryngo oil, E_4:50% eryngo oil
**According to LSD test, in each column, means with the same letters are not significantly different.*

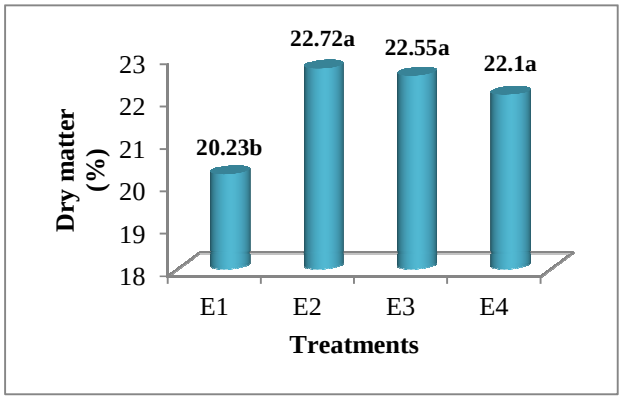

Fig 3- Effect of eryngo oil on dry matter percent of cut chrysanthemum cv. 'Yellow'.
E1: control, E2: 10% eryngo oil, E3: 30% eryngo oil, E_4:50% eryngo oil
**According to LSD test, in each column, means with the same letters are not significantly different.*

CONCLUSION

In present study, eryngo oil increased vase life of cut flowers and improved postharvest quality of cut chrysanthemum flowers.

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